in patients with cell-mediated immune deficits. The most common malignant conditions in which immune deficiency states develop are malignant lymphomas, both Hodgkin's and non-Hodgkin's. Acute leukemias also occur, and the incidence of Kaposi's sarcoma in the recently described acquired immune deficiency syndrome (AIDS) is striking. Other malignant conditions occur but are not increased in incidence above the normal population.

Congenital immunodeficiency states are rare disorders that generally present in childhood, whereas the iatrogenic forms are generally a result of aggressive therapy for malignancy or immunosuppression for transplantation. Until recently, clinically significant acquired immunodeficiency was uncommon; the recent outbreak of AIDS has changed that in many parts of the country.

JAY H. BECKSTEAD, MD

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Cytomegalovirus Infections in Infants

CYTOMEGALIC INCLUSION DISEASE is an infection due to cytomegalovirus, a herpesvirus originally called salivary gland virus. This virus can produce a localized infection, affecting most commonly the gastrointestinal and respiratory tracts, or a generalized infection in which almost any organ may be involved. Histologically, a fairly typical eosinophilic intranuclear inclusion with a clear halo ("owl's eye") can be identified in affected tissues. Occasionally basophilic cytoplasmic granulations are also found.

Infants may acquire the disease in utero, during birth by contamination from the genital canal or by becoming exposed to the virus shortly after birth from sources such as breast milk, tears or other secretions. The infants who appear to be at greater risk are those born to mothers who have acquired a primary infection during gestation.

It is estimated that 0.5% to 2% of the neonates are excreting the virus and that, of these, major complications including central nervous system damage will eventually develop in a significant percentage (10% to 20%). Cytomegalovirus is the most common cause of viral-induced psychomotor retardation. Isolating infants known to be excreting the virus from schools or playgrounds is not practical since many nonidentified children are also excreting the virus.

The most specific and sensitive method for diagnosing a case of cytomegalovirus infection is isolating the virus from tissues, urine, saliva or other body fluids. Detection of IgG antibodies in an infant's blood specimen should be interpreted only in parallel with the mother's IgG antibodies because there is transplacental transfer of this type of antibodies from the mother to the fetus. IgM antibodies do not cross the placenta, but technical problems limit the diagnostic usefulness of routinely measuring their levels.

Vaccines, interferon and several drugs such as acyclovir have been evaluated for the prevention and treatment of cytomegalovirus infections. Although some encouraging results have been obtained, we do not yet have an effective method for controlling this disease.

LUIS M. de la MAZA, MD, PhD

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The Role of Coronary Collateral Arteries in Myocardial Ischemia

THE QUESTIONS whether well-developed coronary collateral arteries afford protection to an ischemic myocardium and whether various interventions such as exercise and pharmacologic agents promote collateral development have been studied in numerous experiments. The equivocal findings reflected the great variation in the number of naturally occurring collateral vessels in animals. Recent studies have been conducted in an animal model that has sparse, innate collaterals and a response to exercise stress similar to that seen in humans.

The effects of exercise on collateral development in myocardial ischemia were studied in pigs subjected to critical coronary artery stenosis and then given exercise training. After five months the exercise-trained animals had a greater increase in coronary collateral flow and smaller infarct sizes than their matched sedentary controls. These findings showed that development of the coronary collateral circulation and myocardial tissue salvage are enhanced by exercise training. Thus, exercise during an evolving infarct is effective as an augmentation to collateral growth but is not without risk. If embarked on, it should be conducted only under rigid medical supervision.

The effects of daily aspirin administration on collateral vessel development in cases of myocardial ischemia were studied in pigs subjected to gradual occlusion of a major coronary artery by an Ameroid constrictor. Coronary collateral blood flows were measured at rest and during exercise stress at three days and two months after coronary artery occlusion. The aspirin-treated animals had greater collateral blood flow during exercise stress (61% versus 45% of control; $P<.001$), smaller myocardial infarcts at autopsy (18% versus 32% of the myocardium at risk; $P<.001$) and more prominent collateral development on gross and histologic examinations.

The results of these studies indicate that in an animal

with sparse innate coronary collateral vessels similar to those in humans, certain interventions can promote coronary collateral artery development and potentially protect ischemic myocardium by salvaging tissue in the jeopardized zone and reducing infarct size.

ROBERTA J. LAMMERS, MD
COLIN M. BLOOR, MD

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The Flow Cytometer in the Clinical Laboratory

FLOW CYTOMETRY involves passing a beam of laser light through a stream of cells and then analyzing the scattered light in relation to the number of cells stained by one or more fluorescent probes. This technique has been used for at least ten years in research laboratories to separate out specific cell populations and to analyze cells and cell populations with respect to surface antibody staining or DNA staining or both.

There are significant advantages to the use of the flow cytometer. Fluorescence microscopy seldom allows for the quantitative measurement of the staining properties of each individual cell, and becomes a very laborious process if more than a few hundred cells are to be analyzed. In addition, bulk measurements of collections of cells give average results for the overall population and do not really delineate possible subpopulations that often exist in lymphomas, for example. Flow cytometry, on the other hand, allows for the rapid and quantitative measurement of thousands of cells and multiple properties of each. For example, DNA content and cell size can be used as criteria for the detection of abnormal populations of malignant cells. It has been shown that hyperdiploid cells can easily be distinguished from their normal counterparts by determining both the size and the DNA content of the cells. Braylan and colleagues have recently used the simultaneous measurement of DNA content and surface markers to define abnormal cell populations in malignant lymphomas. Because malignant cells are capable of changing during the course of a disease, it is important not to rely solely on one method of identification.

The clinical applications of the flow cytometer are generally restricted at present to the analyses of lymphoma and leukemia lymphocytes. Future application may involve a determination of κ- to λ-chain ratios. The amount of each chain on the surface of normal lymphocytes is about equal, whereas in malignant cells, a change in the ratio of κ- to λ-chains is observed. Other applications will involve the detection of autoantibodies in autoimmune hemolytic anemia, neutropenia and immune thrombocytopenia. Of these potential uses, the most developed at present is the detection of antibodies on platelets. Antiplatelet antibodies can be accurately measured in 1 ml of blood from a patient with a platelet count of 1,000 per μl or less. This determination cannot be done by any of the other techniques currently used because of the significantly larger numbers of platelets required.

The primary drawback of this system is the cost. Most flow cytometers currently used for clinical applications cost in excess of $100,000. For use in only a limited number of tests, most hospitals other than large centers for leukemia or lymphoma would have trouble justifying such a large capital expenditure. A problem specifically associated with such sophisticated equipment is that, in spite of attempts to simplify the mode of operation, a highly trained technician is needed to operate the machine because the likelihood of major breakdowns is quite high. In addition, the rate of cells passing through the machine cannot really be increased above 5,000 cells per second and this is relatively slow if one has to analyze a million cells to get reliable data. This is a serious drawback, and unless there is a basic change in technology, it will remain a major limiting factor.

HENRY SIMPKINS, MD, PhD

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Current Trends in Drug Overdose

DRUG AVAILABILITY, price and current fads are mainly responsible for changing trends in drug intoxication. In Los Angeles, phencyclidine hydrochloride (PCP) is widely available, relatively cheap and the most popular drug of abuse. The incidence of admissions to hospital for PCP intoxication is correspondingly high. Four PCP analogues with effects similar to PCP are available on the streets.

Cocaine use is rampant, and cases of severe cocaine poisoning are appearing sporadically. Some patients who die in status epilepticus have a ruptured package of cocaine in the bowel at autopsy.

Heroin, a perennial favorite, is presently abundant and down in price. Intravenous injection of heroin mixed with cocaine (a "speed ball") is an old combination regaining its popularity. A new fad is "smoking" heroin by heating it on a piece of aluminum foil and inhaling the vapors. As the drug volatilizes the particles "jump around" on the foil. This practice is called "chasing the dragon." The most popular narcotic appears to be codeine, usually taken in tablets containing either aspirin or acetaminophen. Acetaminophen intoxication remains a common problem.

Two drugs of the 1960s, glutethimide and LSD (lysergic acid diethylamide), have returned. Glutethi-